Soil Moisture
Active Passive
Mission
SMAP

4th Cal/Val Workshop
Nov. 5-7, 2013
Workshop Overview

Project Status

Cal/Val Overview

Phase 1 Rehearsal

Cal/Val Partners

L1 Cal/Val Plan
  Overview
  Topics
  Inter-calibration/satellite programs

L2-L4 Topics
  In situ sensors
  Sparse networks
  Field experiments
  Triple Co-location

Phase 2 Rehearsal
# Cal/Val Workshop Agenda - Day 3

**Thursday (November 7)**

<table>
<thead>
<tr>
<th>Time</th>
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### L2-L4 Validation Methodologies

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<tr>
<th>Methodology</th>
<th>Role</th>
<th>Constraints</th>
<th>Resolution</th>
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<tr>
<td>Core Validation Sites</td>
<td>Accurate estimates of products at matching scales for a limited set of conditions</td>
<td>• In situ sensor calibration</td>
<td>• In Situ Testbed</td>
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<td>• Cal/Val Partners</td>
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<tr>
<td>Sparse Networks</td>
<td>One point in the grid cell for a wide range of conditions</td>
<td>• In situ sensor calibration</td>
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<td>Field Campaigns</td>
<td>Detailed estimates for a very limited set of conditions</td>
<td>• Resources</td>
<td>• Airborne simulators</td>
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<td>• Schedule conflicts</td>
<td>• Partnerships</td>
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SMAP Cal/Val Phase 2 Rehearsal Goals

• Demonstrates the use of the operational environments and facilities and all of the tools required for the cal/val effort
  – *Effective use of tools in an operational setting*
    • Tools function in the operational environment
    • Tools operate on selected input data sets
    • Tools generate anticipated output
    • Tools run on same hardware that will be used during cal/val
  – *Effective use of the available data*
    • Incorporates SMAP data products
    • Incorporates validation data sets
    • Incorporates QA products and analysis products
  – *Effective use of communication channels and process tools*
    • Employ all established means that the team will use to communicate issues and results and exercise tools for changes
Phase 2 Cal/Val Rehearsal Procedures

- **Prerequisites**
  - *Mission hardware is configured for cal/val*
  - *Data repositories are configured for cal/val*
  - *Software tools and applications are configured for cal/val*
  - *Software tools and applications reside where they will be used during cal/val*

- **Exercises**
  - *Schedule specific time periods in May/June 2014 to run test cases*
  - *Assign team members to execute specific parts of the exercise*
  - *Run all tools with available data with resources intended for mission use*
  - *Employ all report mechanisms and repositories*
  - *Evaluate results and, if necessary, modify procedures accordingly*

- Some exercises will test the use of procedures and tools under anomalous conditions

- Demonstrate mission readiness in time for ORR in August
Phase 2 Cal/Val Rehearsal Planning

• Generate cal/val use cases
  – *The full set of use cases covers all planned cal/val activities*
  – *Use cases will ensure that*
    • The data storage plan provides necessary data sets
    • The tool development plan covers necessary functions

• Document procedures that are common to all cal/val activities.
  – *Those procedures will specify:*
    • Facilities in use and how to access them
    • Location of various data sets
    • Communication methods the cal/val team will use to share information and prepare reports

• Document cal/val procedures that are specific to each use case.
  – *Those procedures will specify:*
    • Prerequisite conditions for each use case
    • Specific sequence of activities
    • Alternatives for expected anomalous conditions
Phase 2 Cal/Val Rehearsal Misc.

• What will be the SMAP data simulator for each product: including L1
• How will DAART operate? Will there be a sub-group for L2 SM?
• The in situ activities before and during Phase 2 should be designed so that by the end of P2
  – *All sites that will be used in the CV Phase are integrated and evaluated*
  – *Core sites should be selected (after the exercise)*
  – *Sparse network sites should be quality controlled to identify the subset that will be used in CV*
  – *Scaling approach defined for each site, network, and product*
• If modeling will be used as a scaling tool, this needs to be ready for Phase 2
• Address satellite and model product comparisons
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Next Activities

• What needs to be done with CV Partners
  1. MOU
  2. Test data set evaluation by SMAP
  3. Data transfer operational
  4. QC of individual sites
  5. Rehearsal feedback and action
  6. Calibration
  7. Scaling for multiple resolutions
  8. Field experiments

• Making sense of statistical CV and Triple co-location
  – Sparse
  – Core
  – Satellite and model products

• Should we establish that if a site does not participate in Phase 2 then we will not use the data in the CV Phase?

• What can we tolerate in terms of latency?

• Between now and Phase 2
  – ADT and CV Partners-continue to add and advance sites
  – CV Partners: address the issues of calibration, referencing, and scaling.
Message to CV Partners

• In situ data are used for assessment of products
• This comparison provides error estimates and a basis for modifying algorithms and/or parameters
• We want to believe that the scaled soil moisture provided from each site is close to the true average 0-5 cm soil moisture (or other variable)
  – *What convinces us? Evidence that*
    • Sensors are calibrated
    • Relationship established between the sensor measurement and the satellite reference (i.e. 0-5 cm soil moisture)
    • A reasonable basis for the scaling function (i.e. n is large)
• If we are convinced of the above, the cause of the difference can be assumed to be in the satellite retrieval (not the in situ)
• In situ data are one of several methodologies used for assessment of products

• Comparisons of in situ and algorithm products provides error estimates and a basis for modifying algorithms and/or parameters

• If we are convinced that the in situ data is reliable, the cause of the difference can be assumed to be in the satellite retrieval

• You can’t cherry-pick data; the basis for using or rejecting in situ data must be established a priori and not after comparison
4th SMAP Cal/Val Workshop: Objectives

• Closure on Phase 1 of the Cal/Val Rehearsal and lessons learned.
• Increased engagement of the Cal/Val Partners and provide them with a better understanding of the Project needs.
• Feedback on the L1 Cal/Val Plan
• Establish a relationship with the L-band inter-calibration working group
• Feedback on the plans for post-launch field campaigns
• Feedback on the Phase 2 Cal/Val Rehearsal plan